

Precise hypocenter distribution of LFEs in Nankai subduction zone: Relationship to the local geometry of the subducting plate

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Recent studies have shown that deep low-frequency tremor in the western Shikoku is a swarm activity of low-frequency earthquakes (LFEs) that occur as shear slips on the plate interface. Tremor and LFEs are also observed in other regions in Nankai subduction zone, such as Tokai, Kii peninsula, Shikoku, and Bungo Channel, but hypocenters in the catalog of Japan Meteorological Agency (JMA) have wide depth distribution and it is not obvious if they are slips on the plate interface. This is because of large noise, which also yields large errors when we apply a previous hypocenter determination method using cross-correlation for each station. To overcome this problem, we develop a new robust hypocenter determination method that utilizes the summed waveform cross-correlation coefficient over many stations, termed a network correlation coefficient (NCC). In this study, we apply this network correlation method to 1,566 LFEs in JMA catalog which occur from 2002 to 2008 along Nankai trough. Relocated hypocenters construct plane surfaces in every region, which suggests LFEs in Nankai subduction zone occur on the plate boundary as demonstrated in the western Shikoku. We further show precise LFE distribution is very consistent with the geometry of the subducting Philippine Sea plate. It also suggests the possibility that precise locations of the plate boundary are estimated by the tremor locations.